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## Offering Induction of Labor for 22-Week Premature Rupture of Membranes: A Survey of Obstetricians

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### Abstract

**Objective**—To describe obstetricians' induction counseling practices for 22-week preterm premature rupture of membranes (PPROM) and identify provider characteristics associated with offering induction.

**Methods**—Surveyed 295 obstetricians on their likelihood (0–10) of offering induction for periviable PPRM across 10 vignettes. 22-week vignettes were analyzed, stratified by parental resuscitation preference. Bivariate analyses identified physician characteristics associated with reported likelihood ratings.

**Results**—Obstetricians (N=205) were not likely to offer induction. Median ratings by preference were: resuscitation 1.0, uncertain 1.0, and comfort care 3.0. Only 41% of obstetricians were likely to offer induction to patients desiring comfort care. Additionally, several provider-level factors, including practice region, parenting status, and years in practice, were significantly associated with offering induction.

**Conclusions**—Obstetricians do not readily offer induction when counseling patients with 22-week ruptured membranes, even when patients prefer palliation. This may place women at risk for infectious complications without accruing a neonatal benefit from prolonged latency.

### Introduction

Preterm premature rupture of membranes (PPROM) is a complication of pregnancy that significantly increases the risks of neonatal morbidity and mortality and adverse maternal outcomes. The consequences are especially profound when the complication occurs in the periviable period.<sup>1</sup> Currently, the widely accepted threshold of viability is 24 weeks; however, advancements in both obstetric and neonatal care have led to more aggressive intervention at earlier gestational ages. In fact, in a joint workshop, the Society for Maternal-Fetal Medicine, the American College of Obstetrics and Gynecology, the American Academy of Pediatrics, and the Eunice Kennedy Shriver National Institute of Child Health and Human Development defined the periviable period as occurring between 20 0/7 weeks

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#### Conflict of Interest

The authors report no conflict of interest.

and 25 6/7 weeks gestation.<sup>2</sup> Although neonatal survival is not expected to occur at the lower end of this range, 22 weeks has become the point at which survival is plausible and providers are increasingly counseling patients on possible resuscitative measures.<sup>2, 3</sup>

The current standard of care for pregnancies affected by PPROM between 24 and 34 weeks gestation consists of expectant management, with administration of antibiotics intended to prolong the pregnancy. During the resulting latency period, maternal health may be compromised by infectious complications.<sup>4, 5, 6, 7</sup> However, these risks are weighed in balance with the risk of prematurity-related complications, and efforts are made to maximize neonatal survival and minimize neonatal morbidity. In the case of 22 week gestations, wherein the probabilities of survival and survival without moderate to severe impairment approach zero, the balance of risks and benefits shifts, such that maternal risks may exceed neonatal benefit. In turn, concerns about patient safety may warrant the consideration of termination of the pregnancy.

Details about the counseling women receive regarding termination of pregnancy as an alternative to expectant management of 22-week PPROM represents a gap in the current literature. Previous work has documented that, when offered, as many as 50% of women presenting with PPROM elect to terminate the pregnancy to avoid poor maternal or fetal outcomes.<sup>8</sup> However, patients cannot choose options about which they are not informed. As the threshold for intervention and resuscitation moves to earlier gestational ages, it is unclear whether obstetricians are currently offering patients the option of labor induction for pregnancy termination as an alternative to expectant management at the lower limits of viability. Little is known about the factors that influence an obstetrician's willingness to offer induction or the extent to which this counseling practice is dependent upon a patient's preference for resuscitation or palliation. Therefore, the purpose of this study was to explore obstetricians' induction counseling practices for patients presenting with PPROM at 22 weeks GA when patients voice different preferences for resuscitative care. More specifically, we aimed to, first, determine an obstetricians' overall likelihood of offering induction; then identify provider and practice setting characteristics associated with likelihood of offering induction.

## Methods

This is a secondary analysis of survey data collected from a convenience sample of 295 obstetricians as part of a larger study assessing the influence of various patient clinical and sociodemographic characteristics on obstetrical decision-making for periviable delivery management. Participants were recruited on-site at the American College of Obstetrics and Gynecology Annual Clinical Meeting in New Orleans, LA in May 2013. Physicians practicing as general obstetrician-gynecologists (OB/GYN) and maternal-fetal medicine (MFM) specialists in the US were eligible to participate.

The survey instrument consisted of 10 clinical case vignettes, as well as items assessing participants' practice patterns in periviable delivery management and demographics. Study design and vignette development have previously been described at length.<sup>9</sup> To summarize, each vignette described a patient presenting with PPROM with four varying characteristics,

each having two or three levels: 1. Gestational Age and 50<sup>th</sup> percentile Estimated Fetal Weight (levels: 22 1/7 & 494g vs 23 1/7 & 582g vs 24 1/7 & 676g); 2. Occupation (levels: corporate manager vs janitor); 3. Fertility History/Method of Conception (levels: IVF vs spontaneous conception); and 4. Patient Resuscitation Preference (levels: desires resuscitation vs desires comfort care vs uncertain). Using an 11-point scale ranging from 0 (definitely would not) to 10 (definitely would), participants were asked to rate their likelihood of 1) ordering steroids, 2) offering induction, 3) performing a cesarean for progression of labor, and 4) performing a cesarean for indications of fetal distress. We varied race between, rather than within, subject, by randomly assigning participants to receive a survey describing all Black patients or all White patients on a 1:1 basis. In its entirety, the survey took approximately 15 minutes to complete. Participants received a gift card and raffle entries as compensation.

Three of the ten vignettes queried practice patterns for patients presenting with PPROM at 22 weeks gestation. Physician ratings for their likelihood of offering induction for these 22-week vignettes were included in this analysis, as measured by the item, “Based on the information given, if you were managing this patient today how likely would you be to offer induction?” Findings from the larger study suggest occupation and fertility history had minimal influence on obstetricians’ ratings; therefore, these characteristics were not considered here.<sup>9</sup> Conversely, parental preference was found to have a substantial influence on periviable management decisions; therefore, analyses were stratified by the three preference levels: desires resuscitation, desires comfort care, and uncertain.

Univariate statistics were utilized to describe the study population and provide summary statistics on participants’ likelihood ratings. Ratings were dichotomized to characterize obstetricians as “likely” (likelihood rating >5) or “unlikely” (likelihood rating ≤ 5) to offer induction. Pearson  $\chi^2$ , Fisher’s exact, and Student’s t-tests were used for bivariate analyses. Data were analyzed with SPSS 21 (IBM, Chicago, IL, USA). The study was approved by the Institutional Review Board of Indiana University.

## Results

In total, 205 obstetricians completed likelihood ratings for induction practices on all 22-week vignettes. Ninety obstetricians were excluded from analysis for returning an incomplete survey or failing to meet inclusion criteria. Of the eligible respondents, 65% were female, 54% White, and 4% were maternal-fetal medicine specialists. Seventy one percent were married, 71% parents, and 7% parents of a child with special needs. On average, respondents were 44 years old and had been in practice for 12.5 years. Participants represented all regions of the United States, with 30% from the Northeast, 25% Southeast, 18% Midwest, 16% West, and 8% Southwest. The majority reported working in private practice or a hospital-owned practice (35% and 27%, respectively), and 56% supervised residents. Of note, only 5 (2%) obstetricians worked in an institution where the age of viability was considered 22 weeks or less; the majority (53%) reported a cutoff of 24 weeks. Participant characteristics are further described in Table 1.

Overall, participants were not likely to offer induction to a patient presenting with PPROM at 22 weeks. Median ratings for each vignette were as follows: resuscitation 1.0, uncertain 1.0, and comfort care 3.0. For parental preferences of comfort, uncertainty, and resuscitation, a likelihood rating of “0” was provided by 37%, 42%, and 45% of obstetricians, respectively. Conversely, 27%, 24%, and 21% of obstetricians provided a likelihood rating of “10” for these respective patient preferences. In terms of dichotomous likelihood scores, obstetricians reported a low likelihood of offering induction. Fewer than half (41%, 84) of obstetricians were ‘likely’ (rating >5) to offer induction for a patient that desired comfort care, and roughly a third were likely to offer induction to a parent seeking resuscitation (32%, 66) or an uncertain patient (35%, 71). Additionally, an analysis of induction practices by patient race found that participants were more likely to offer induction to a Black parent desiring comfort care compared to a White parent with the same preference ( $p=.026$ ).

Several personal and professional physician characteristics were associated with an increased likelihood of offering induction (Table 2). Parenting obstetricians were more likely to offer induction when the vignette featured a parent desiring comfort care ( $p=.025$ ) or a parent uncertain about pursuing resuscitation ( $p=.005$ ). Obstetricians practicing in the Northeast were most likely to offer induction compared to physicians from all other regions, which held true for both the comfort care ( $p=.046$ ) and uncertain ( $p=.006$ ) preference vignettes. Low attendance at religious services, low valuation of the importance of religion, and resident supervision were also associated with an increased likelihood of offering induction to an uncertain parent ( $p=.011$ ,  $p=.025$ , and  $p=.028$ , respectively). Across all three vignettes, age and years in practice were significantly lower among obstetricians likely to offer induction (all  $p<.011$ ).

## Discussion

The present study aimed to characterize induction counseling practices among obstetricians faced with patients presenting with PPROM at 22 weeks GA with variable resuscitation preferences. Overall, obstetricians did not readily offer inductions. Ratings were highest for patients desiring comfort care, yet, fewer than half of obstetricians were likely to offer an induction to these patients despite the stated preference for non-resuscitative care. With respect to patient characteristics, physicians were more likely to offer induction to Black patients desiring comfort care than White patients desiring comfort care. With respect to physician characteristics, obstetricians who were parents, less religious, lived in the Northeastern United States, and supervised residents had a higher likelihood of offering induction in situations where the parents desired comfort care or were uncertain about neonatal resuscitation; younger obstetricians and those with fewer years of experience were also more likely to offer induction across all three patient preferences.

Even when presented with patients pursuing palliation, fewer than half of obstetricians were likely to offer the patient an induction. Approximately 37% of women who experience PPROM develop chorioamnionitis, 11% develop endometritis, and 1% become septic.<sup>10</sup> In light of this potential for substantial maternal morbidity, forgoing induction counseling to instead focus on efforts to prolong the pregnancy may result in unnecessary maternal

morbidity with no added benefit for neonatal survival, particularly when patients intend to pursue palliation as the course of care. Of note, our previous work suggests that obstetricians often defer discussions of resuscitation preferences to neonatologists,<sup>11</sup> and both obstetricians and neonatologists tend to overemphasize technical or medical information and fail to elicit values and preferences.<sup>12</sup> Because antenatal management strategies should be consistent with resuscitation preferences, this work highlights the need for obstetricians to address and elicit resuscitation preferences in order to align antenatal management, including the possibility of labor induction, with patients' stated preferences. To avoid undue maternal morbidity, training in shared decision-making<sup>13, 14, 15, 16</sup> and decision support interventions<sup>17</sup> for resuscitation decisions are needed to facilitate these exchanges and ensure that obstetrical management plans are aligned with patients' goals of care.

Notably, physicians were more likely to counsel a Black patient on induction than a White patient when the patient desired comfort care. Previous research has documented an increased prevalence of reproductive tract infections among black women compared to women of other races.<sup>18</sup> Furthermore, physicians screen black women for sexually transmitted infections disproportionately more often than their white counterparts.<sup>19</sup> This may reflect stereotyping, based on conscious or unconscious bias.

It is plausible, then, that physicians' perceptions of a black patient's risk status, based on increased prevalence of pre-existing infections or increased risk of developing an infection, may explain our observation. Additional research is needed to assess possible racial differences in induction counseling for periviable PPRM.

Recently, the American College of Obstetrics and Gynecology, the Society for Maternal-Fetal Medicine, the American Academy of Pediatrics, and the Eunice Kennedy Shriver National Institute of Child Health and Human Development convened to discuss various aspects of periviable care, including recommendations for approaches to counseling patients facing extremely preterm deliveries.<sup>2</sup> They concluded that, "When death is anticipated, the parents should be informed about the option of termination of pregnancy if this is consistent with regional statutes" (Raju et al, p 1088). We found that, currently, obstetricians do not readily counsel patients on induction, even at 22 weeks GA when neonatal survival is unlikely. These data may serve as a baseline to monitor uptake of the new practice guidance. Moreover, previous research suggests it is feasible to institute standardized counseling guidelines for periviable patients.<sup>20</sup> As efforts continue to be made to provide guidance for physicians managing periviable patients, additional attention should be directed toward promoting comprehensive counseling that informs patients of all management options that are within the legal limits of the delivery institution.

This study was not without limitations. Study participants were recruited as a convenience sample, which limits the generalizability of the findings. Furthermore, the survey was conducted at the ACOG Annual Clinical Meeting, and as a result, attendees were primarily generalists and community practitioners. Although some would argue maternal-fetal medicine (MFM) specialists would be a more appropriate population to query, it is also critically important to understand the counseling practices of generalists, as they are typically the physicians to deliver the PPRM diagnosis and initiate the counseling process.

Our previous work has shown that nearly one third of generalists manage periviable deliveries without input from MFM consultants, which may especially be the case at 22 weeks.<sup>21</sup> Future studies should, however, include a larger MFM sample in order to capture the practices of the specialists with the greatest impact on periviable care. Furthermore, this study did not include neonatologists, whose responses may differ due to the availability of the online Neonatal Outcome Data, which may facilitate pediatric decision-making in this setting. Such resources may be utilized differentially, resulting in differences in cross-specialty perspectives on survivability. Additionally, the survey instrument failed to capture information about hospital-level policies that prohibit pregnancy terminations. Termination of the pregnancy may be restricted in many facilities by state laws and/or institutional policies therefore, it is difficult to determine the influence of practice setting on the reported behaviors. We found that inductions were not readily offered, but the extent to which these findings represent obstetricians' true practice behaviors is uncertain. Moreover, the survey relied upon self-report and was subject to recall bias, which limits the extent to which reports of behaviors and institutional norms can be deemed accurate. Finally, due to the exploratory nature of this endeavor, adjustments were not made for multiple comparisons, which may have obscured potential findings that warrant further exploration.<sup>22</sup> As a result, the findings may be subject to Type I error.

In closing, obstetrical counseling for periviable patients is characterized by uncertainty and challenged by the need to address concerns for both the health of the mother and fetus. Current recommendations suggest physician counseling of periviable patients should be comprehensive and include discussion of all possible management plans, including termination of the pregnancy when appropriate.<sup>2</sup> Notably, we found that induction is not frequently offered, even for patients who do not express a desire to pursue resuscitation for their neonate. The infrequency of induction counseling is of concern, since continuation of the pregnancy puts mothers at risk. Furthermore, the observed association between physician characteristics and increased likelihood of offering induction suggests inconsistencies in induction counseling may be driven by provider-level factors. Additional research is necessary in order to further explore provider and institutional influences on periviable counseling and outcomes and to better align periviable care with patient preferences.

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**Table 1**

## Participant Characteristics (N=205)

	N(%)
Age	44 (mean); 27–76 (range)
# of Years Since Residency	12.5 (mean); 0–48 (range)
Specialty	
OB/GYN Generalist	189 (92)
Maternal-Fetal Medicine (MFM)	9 (4)
Other	3 (2)
Missing	4 (2)
Sex	
Male	70 (34)
Female	133 (65)
Missing	2 (1)
Race/Ethnicity	
White	110 (54)
Black	54 (26)
Asian	25 (12)
Other	12 (6)
Missing	4 (2)
Practice Region	
Northeast	61 (30)
Southeast	51 (25)
Midwest	37 (18)
West	32 (16)
Southwest	16 (8)
Missing	8 (4)
Practice Setting	
Private Practice	72 (3)
Health Maintenance Organization	9 (4)
Hospital-owned Practice	56 (27)
University-based	49 (24)
Other	12 (6)
Missing	7 (3)
Religious Affiliation	
Protestant	74 (36)
Catholic	51 (25)
Jewish	22 (11)

	<i>N</i> (%)
Other	26 (13)
None	26 (13)
Missing	6 (3)
<b>Religious Service Attendance</b>	
Low Attenders	98 (48)
High Attenders	102 (50)
Missing	5 (2)
<b>Importance of Religion</b>	
Low Importance	82 (40)
High Importance	98 (48)
N/A. No religion.	22 (11)
Missing	3 (2)
<b>Marital Status</b>	
Single, never married	41 (20)
Married or partnered	146 (71)
Divorced or separated	14 (7)
Other	2 (1)
Missing	2 (1)
<b>Parent</b>	
Yes	146 (71)
No	57 (28)
Missing	2 (1)
<b>Supervise Residents</b>	
Yes	114 (56)
No	87 (42)
Missing	4 (2)
<b>Institutional Viability Cutoff</b>	
22 Weeks or Less	5 (2)
23 Weeks	77 (38)
24 Weeks	109 (53)
25 Weeks or More	4 (2)
Missing	10 (5)

**Table 2**  
 Characteristics of Providers Likely to Offer Induction at 22 Weeks, Stratified by Patient Preference

	Resuscitation		Comfort Care/Palliation		Uncertain	
	N(%)	P	N(%)	P	N(%)	P
Age*	N/A	.010	N/A	.008	N/A	.005
# of Years Since Residency*	N/A	.003	N/A	.011	N/A	.004
Specialty		.749		.440		.825
OB/GYN Generalist	61 (92)		76 (92)		65 (93)	
Maternal-Fetal Medicine (MFEM)	4 (6)		5 (6)		4 (6)	
Other	1 (2)		2 (2.4)		1 (1)	
Sex		.239		.369		.207
Male	20 (30)		27 (33)		21 (30)	
Female	46 (70)		56 (67)		49 (70)	
Race		.461		.581		.191
White	32 (49)		42 (51)		40 (57)	
Black	19 (29)		23 (28)		17 (24)	
Asian	11 (17)		13 (16)		0 (0)	
Other	3 (5)		4 (5)		10 (14)	
Practice Region		.114		.046		.006
Northeast	28 (42)		34 (41)		32 (46)	
Southeast	14 (21)		16 (19)		12 (17)	
Midwest	8 (12)		11 (13)		8 (11)	
Southwest	11 (17)		15 (18)		13 (19)	
West	5 (8)		7 (8)		5 (7)	
Practice Setting		.247		.261		.084
Private Practice	19 (30)		29 (36)		20 (30)	
Health Maintenance Organization	2 (3)		5 (6)		4 (6)	

	Resuscitation		Comfort Care/Palliation		Uncertain	
	N(%)	P	N(%)	P	N(%)	P
Hospital-owned Practice	18 (28)		19 (24)		18 (27)	
University-based	22 (34)		25 (31)		24 (35)	
Other	3 (5)		3 (4)		2 (3)	
Religious Affiliation		.447		.631		.756
Protestant	24 (36)		30 (37)		22 (31)	
Catholic	14 (21)		17 (21)		13 (19)	
Jewish	10 (15)		10 (12)		12 (17)	
Other	11 (17)		12 (15)		11 (16)	
None	7 (11)		13 (13)		12 (17)	
Religious Service Attendance		.364		.107		.011
Low Attenders	34 (52)		45 (55)		42 (61)	
High Attenders	32 (49)		37 (45)		27 (39)	
Importance of Religion		.661		.214		.025
Low Importance	29 (44)		36 (43)		32 (46)	
High Importance	29 (44)		35 (42)		26 (37)	
N/A. No religion.	8 (12)		12 (15)		12 (17)	
Marital Status		.253		.245		.131
Single, never married	18 (27)		21 (25)		20 (29)	
Married or partnered	43 (65)		58 (70)		44 (63)	
Divorced or separated	5 (8)		4 (5)		5 (7)	
Other	0 (0)		0 (0)		1 (1)	
Parent		.050		.025		.005
Yes	42 (64)		53 (64)		42 (60)	
No	24 (36)		30 (36)		28 (40)	
Supervise Residents		.212		.124		.028
Yes	40 (62)		51 (62)		46 (67)	

	Resuscitation		Comfort Care/Palliation		Uncertain	
	N(%)	P	N(%)	P	N(%)	P
No	25 (39)		31 (38)		23 (33)	
Institutional Viability Cutoff		.294		.126		.303
22 weeks or less	0 (0)		0 (0)		0 (0)	
23 weeks	23 (36)		30 (38)		25 (37)	
24 weeks	39 (61)		47 (59)		41 (60)	
25 weeks or more	2 (3)		3 (4)		2 (3)	

\* Denotes continuous variable